Cannabis PT

Cannabis Proficiency Testing Scheme

Scheme Description

LGC Standards
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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
1	June 2020	Scheme introduction	S Xystouris T Noblett
2	Sept 2020	CAS numbers added for mycotoxins and elements. Included analyte for Detection of Aspergillus species	S Xystouris T.Noblett
3	July 2021	Range changed for sample 1 Changed sample size for mycotoxins sample 3 Updated email address	S Xystouris A.Collins
4	Nov 2021	Removed the Micro samples (PT-CA-06 and PT-CA-07)	A Collins
5	Sept 2022	Amended the concentration ranges for 1A Removed sample 1B, 3 and 5 Added sample 10,11,12	S Xystouris
6	April 2023	Removed appendix Amended the sample size for cannabis flower samples. Amended THC, CBD, CBDV analyte name to “total”. Added the Δ-9 THCA for samples 10 and 11.	S. Xystouris
7	Sept 2023	Added new sample for Kratom Added terpenes to Sample 10 (combined 12 and 10) Changed the sample size for sample 10. Removed sample 2 (terpenes in oil) and 12 (terpenes in cannabis flowers)	S. Xystouris

Notes:
Where this document has been translated, the English version shall remain the definitive version

Scheme Aims and Organisation

The primary aim of the Cannabis Analytes Proficiency Testing Scheme is to enable laboratories performing the analysis of cannabis to monitor their performance and compare it with that of their peers. Cannabis PT also aims to provide information to participants on technical issues and methodologies relating to testing of Cannabis.

The Cannabis PT scheme year operates from January to December. Further information about Cannabis PT, including test material availability, round despatch dates and reporting deadlines, are available on the current Cannabis PT application form.

Test Materials

Details of test materials available in Cannabis PT are given in Appendix A. The test parameters are continually reviewed to ensure they meet the needs of current laboratory testing and regulatory requirements.

Test material batches are tested for homogeneity for at least one test parameter where deemed appropriate. Details of homogeneity tests performed and results are given in the Cannabis PT Scheme Reports.

Some aspects of the scheme, such as test material production, homogeneity testing and stability assessment, can from time to time be subcontracted. When subcontracting occurs, it is placed with a competent subcontractor and LGC is responsible for this work. The planning of the scheme, the evaluation of performance and the authorisation of the final report will never be subcontracted.

Statistical Analysis

Information on the statistics used in Cannabis PT can be found in the General Protocol and in the Scheme Report. Methods for determining assigned values and the values for SDPA used for individual samples are given in Appendix A

Methods

Methods are listed in PORTAL. Please select the most appropriate method from the list. If none of the methods are appropriate, then please report your method as ‘Other’ and record a brief description in the Comments Section in PORTAL.

Results and Reports

Cannabis PT results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email.

Cannabis PT reports will be available on the website within 10 working days of round closure. Participants will be emailed a link to the report when it is available.

APPENDIX A - Description of abbreviations used

Assigned Value (AV)

The assigned value may be derived in the following ways:

- From the robust mean (median) of participant results (RMean). This is the median of participant results after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. Generally, the assigned value will be set using results from all methods, unless the measurement is considered method-dependant, in which case the assigned value will be set by method as illustrated in the report tables.
  For some analytes, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular analyte i.e. it would be applied to results obtained by any method.

  Traceability: Assigned values which are derived from the participant results, or a sub-set of the results are not traceable to an international measurement standard. The uncertainty of assigned values derived in this way is estimated from the participant results, according to ISO 13528.

- From a formulation value (Formulation). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of analyte have been used to prepare the sample.

  Traceability: Assigned values calculated from the formulation of the test sample are traceable, via an unbroken metrological traceability chain, to an international measurement standard. The measurement uncertainty of the assigned value is calculated using the contributions from each calibration in the traceability chain.

- From a qualitative formulation (Qual Form). This applies to qualitative tests where the assigned value is simply based on the presence/absence of the analyte in the test material.

  Traceability: Assigned values calculated from the qualitative formulation of the test sample are traceable to a certified reference standard or a microbiological reference strain.

- From expert labs (Expert). The assigned value for the analyte is provided by an ‘expert’ laboratory.

  Traceability: Assigned values provided by an ‘expert’ laboratory may be traceable to an international measurement standard, according to the laboratory and the method used. The uncertainty of measurement for an assigned value produced in this way will be provided by the laboratory undertaking the analysis. Details of traceability and the associated uncertainty will be provided in the report for the scheme/round.

Range
This indicates the concentration range at which the analyte may be present in the test material.

SDPA
SDPA represents the ‘standard deviation for proficiency assessment’ which is used to assess participant performance for the measurement of each analyte. This may be a fixed value (as stated), a percentage (%) of the assigned value or based on the robust standard deviation of the participant measurement results, either across all methods or by method depending on whether the measurement made is method dependent (see assigned value).

Units
This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some analytes in some schemes participants may have a choice of which units to report their results, however, the units stipulated in this scheme description are the default units to which any results reported using allowable alternative results will be converted to.

DP
This indicates the number of decimal places to which participants should report their measurement results.

Sample PT-CA-01A **Analysis of active ingredients (With THC)**

Supplied as 10g of hemp oil
10g of blank hemp oil

Analyte	CAS	Method	Range	AV	SDPA	Units	DP
Δ9-Tetrahydrocannabinol (THC)	1972-08-3	HPLC, GC-MS, LC-MS/MS, Other	0-90	RMean	Robust SD	µg/g	2
Cannabidiol (CBD)	13956-29-1	HPLC, GC-MS, LC-MS/MS, Other	0-70	RMean	Robust SD	% w/w	2
Cannabidiolic Acid (CBDA)	1244-58-2	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabinol (CBN)	521-35-7	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabichromene (CBC)	20675-51-8	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabigerol (CBG)	25654-31-3	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabicyclol (CBL)	21366-63-2	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabidivarin (CBDV)	24274-48-4	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2
Cannabidivarinic acid (CBDVA)	31932-13-5	HPLC, GC-MS, LC-MS/MS, Other	0-80	RMean	Robust SD	µg/g	2

Sample PT-CA-04 **Analysis of elements**

Supplied as 10g of simulated dried cannabis plant

Analyte	CAS	Method	Range	AV	SDPA	Units	DP
Arsenic	7440-38-2	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Cadmium	7440-43-9	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Mercury	7439-97-6	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Lead	7439-92-1	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Copper	7440-50-8	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Iron	7439-89-6	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Manganese	7439-96-5	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Nickel	7440-02-0	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Zinc	7440-66-6	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	mg/kg	2
Calcium	7440-70-2	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	g/kg	2
Magnesium	7439-95-4	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	g/kg	2
Potassium	7440-09-7	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	g/kg	2
Sulphur	7704-34-9	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	g/kg	2
Phosphorus	7723-14-0	AAS, ICP-OES, ICP-MS, Other	All	RMean	Robust SD	g/kg	2

Sample PT-CA-10 **Analysis of active ingredients and terpenes**

Supplied as 2g of cannabis flowers

Analyte	CAS	Method	Range	AV	SDPA	Units	DP
Total Δ9-Tetrahydrocannabinol (Δ-9 THC)	1972-08-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Δ9-Tetrahydrocannabinolic acid (Δ-9 THCA)	23978-85-0	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Total cannabidiol (CBD)	13956-29-1	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabidiolic Acid (CBDA)	1244-58-2	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabinol (CBN)	521-35-7	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabichromene (CBC)	20675-51-8	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabigerol (CBG)	25654-31-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabicyclol (CBL)	21366-63-2	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Total cannabidivarin (CBDV)	24274-48-4	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabidivarinic acid (CBDVA)	31932-13-5	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
(-)-α-Bisabolol	23089-26-1	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
α-Humulene	6753-98-6	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
α-Pinene	80-56-8	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
α-Terpinolene	586-62-9	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
β-Caryophyllene	87-44-5	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
β-Myrcene	123-35-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
(1S)-(-)-β-Pinene	18172-67-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
(-)-Caryophyllene oxide	1139-30-6	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
R-(+)-Limonene	5989-27-5	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Linalool	78-70-6	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2

Sample PT-CA-11 **Analysis of active ingredients (including THC)**

Supplied as 5g of cannabis oil

Analyte	CAS	Method	Range	AV	SDPA	Units	DP
Total Δ9-Tetrahydrocannabinol (Δ-9 THC)	1972-08-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Δ9-Tetrahydrocannabinolic acid (Δ-9 THCA)	23978-85-0	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Total cannabidiol (CBD)	13956-29-1	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabidiolic Acid (CBDA)	1244-58-2	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabinol (CBN)	521-35-7	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabichromene (CBC)	20675-51-8	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabigerol (CBG)	25654-31-3	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabicyclol (CBL)	21366-63-2	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Total cannabidivarin (CBDV)	24274-48-4	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2
Cannabidivarinic acid (CBDVA)	31932-13-5	HPLC, GC-MS, LC-MS/MS, Other	All	RMean	Robust SD	% w/w	2

Sample PT-CA-13 **Mitragynine and 7-hydroxy mitragynine in Kratom**

Supplied as 5g of kratom

Analyte	CAS	Method	Range	AV	SDPA	Units	DP
Mitragynine			All	RMean	Robust SD		
7-hydroxy mitragynine			All	RMean	Robust SD		